S-122 Item 1 Copy 1

(3)

TOP SECRET"U"

TICOM I-44

MEMORANDUM ON SPEECH ENCIPHERMENT APPARATUS BY ORR HUETTENHAIN AND SDF. DR. FRICKE.

The attached memorandum on Speech Encipherment Apparatus was prepared jointly by ORR Huettenhain and Sdf. Dr. Fricke of OKW/Chi at the request of Ticom.

TICOM
1st Aug 1945

No. of Pages 1
Copy No. 28

Distribution

British
1. Director
2. D.D.3
3. D.D.4
4. D.D.(N.S.)
5. D.D.(MW)
6. D.D.(A.S.)
7-8 A.D.(C.C.R.)(2)
9. Col. Leathem

U.S.
25-26 OP20-G(2)(via Lt. Prendergrass
27. (via Lt. Col. Hilles)
28-29 S.S.A.(2)(via Major Seaman)
30. Director, S.I.D. ETOUSA(via Lt. Col. Johnson)

TICOM
10. Chairman
11-12 S.A.C.(2)
13. CDR. Bacon
14. Cdr. MacKenzie
15. Cdr. Tandy
16. Lt. Col. Johnson
17. Lt. Cdr. Manson
18. Major Seaman
19. Lt. Eachus
20. Lt. Vance
21. Capt. Cowan
22. Lt. Fehl
23-24 Ticom Files(2)

ADDITIONAL
31. Major Manson
32. Dr. Turing
33. D.D.S.D.(Y) Admiralty
34. D.D.(Y) War Office
35. D.D.I.4. Air ministry

Do Not Destroy. Return to the NSA Library when no longer needed.
S-454
Copy No.

TOP SECRET"U"

SPEECH ENCIPHERMENT APPARATUS

A) Historical development in Germany

Up to 1943 various authorities and firms in GERMANY on their own without nedessary and real direction by the Reich concerned themselves with speech encipherment apparatus. In Summer 1943(?) all authorities and firms engaged on the development of speech encipherment were called together by Chef WNV. The aim of these discussions was to stop all developments which could not lead to success in a reasonable time and to promote the fodlowing developments:

1) A "Spracherschwerungsgerät". Operators ought not to be able to listen in on conversation and listening in ought only to be possible with technical means of the same order as the "Erschwerungsgeräte" itself.

2) Absolutely secure speedh encipherment equipment. This ought to be absolutely unbreakable according to the present state of cryptography. The following firms and authorities met:

Heereswaffenamt Prüf.7, BERLIN (only to direct, not development)
GAF Experimental Station (Versuchsanstalt)RECHLIN/MECKLENBURG
Reichspost-Zentralamt.Siemens and Halske,Telefunken,AEG,Lorenz.A.G,
TKD(Telephon-Kabel-Draht),Laboratorium Feuerstein (Prof.Dr. Vierling)
Ebermannstadt.

These authorities presented their developments and further intentions. All basic procedures of speech encipherment and to some extent combinations of basic procedures:

Tigerstedt system (TDS)
Frequenc· and amplitude "Wobbeling"
Inverting(Invertierung)
Division into Frequency bands(Frequenzbandaufteilung)
Superposition of noise methods(Geräuschbeimischung and Geräüschüberlagerung)
Transposition of frequency channels (Kanalvertauschung)
According to the principle of artificial speech(Kennwertverfahren)

The result of these demonstrations and discussions was:
All authorities and firms with the exception of Laboratorium Feuerstein stopped their development work as the conditions demanded could not be fulfilled in reasonable time.

B. Latest state of development.

One model of the "Erschwerungsgerät Baustein"was completed by Prof. VIERLING at the beginning of 45. Further 30 models were to follow in the spring. The secure speech encipherment apparatus was still being developed. The circuit was to be ready in a few months.Chi was commissioned in Nov.44 by Chef WNV to undertake the checking of these developments. Owing to the general war situation in recent months it was no longer possible to do this in such a way that technical details could be reliably reconstructed. Exhaustive information concerning this can only be provided by Prof. VIERLING himself and Dr.

VOCODER

Note - Vierling followed up on a suggestion made by H. Dudley of Bell Labs (apparently from an article in a technical journal) which involved splitting up speech into individual characteristics which is then artificially reproduced in the receiver by controlling these characteristics. See complete Vierling write-up in TICOM/I-43.

MR.

LIEBKNECHT (Wa Prüf 7). The following details therefore which are bas ed on verbal information received from Dr. LIEBKNECHT must be treated with reserve:

1) Erschwerungsgerät Baustein
Size and weight that of the old inverter (pack-model)
It works without variable keys
Principle: Inverting(?) and "Geräuschbeimischung".
Further details are not known.

2) Speech encipherment apparatus.
The speech frequency band is divided into ten channels(according to the principle of artificial speech)
The speech elements in each of the ten channels"gewobbelt" according to a rotating principle. The control of the "Wobbelung"is carried out by the ten peg wheels of the SZ 42. Further details are not known.